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Cleaning Pistons of 1.9L -The Saturn Way

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11-28-2005, 06:01 PM

#1

[bgsneeze](#)

Member

Join Date: Jan 2005

Location: Ohio

Posts: 285

2003 ION-2 Quad Coupe

1997 SL2

Cleaning Pistons of 1.9L -The Saturn Way

ok, this is from a TSB (Oil Consumption Concern #94-T-59A - (Apr 16, 2003)) The Guys at the local dealership were very nice to share this with me
Im not sure if this was already posted here on the forums but i thought it might help, I thought it was interesting that they want Mobil 1 used rught after the procedure. I just cover the internal engine cleaning - if people want i can post the later section on engine repair of the rings,

I Quote the TSB starting here :

"All 1991 - 1997 Saturn S-Series Vehicles
Condition

Some customers may comment that the engine is using 1 quart (0.951 liter) or more of oil every 3000 mi. (4827 km).
Cause

Engine oil consumption greater than 1 quart (0.951 liter) in 3000 mi. (4827 km) may be caused by stuck/sticking oil control and/or compression rings. Engine deposits may build up on and around the oil control ring(s), compression ring(s) and piston ring land(s) causing the ring(s) to stick and become less effective.
Correction

Perform internal engine cleaning procedure or engine repair procedure depending on amount of oil consumption.

IF engine uses 1 quart (0.951 liter) of oil in:

1500 mi. - 3000 mi. (2414 km -4827 km), perform Procedure 1: Internal Engine Cleaning

1499 mi. (2414 km) or less, perform Procedure 2: Engine Repair

While Saturn still considers oil consumption of 1 quart (0.951 liter) in 2000 mi. (3218 km) to be an acceptable level, the engine cleaning procedure contained in this bulletin may improve oil consumption performance to an even more acceptable level.
Engine Inspection and Oil Consumption Test:

1. Inspect engine for external oil leaks and repair as necessary.

2. Verify that the correct crankcase ventilation (PCV) valve is installed. Some aftermarket PCV valves do not meet Saturn specification and can cause oil consumption. (Refer to the following chart for correct application.)

3. Change engine oil and filter (3.8 liters [4 quarts] of oil are required to properly fill the crankcase).

4. Start engine and bring up to normal operating temperature of 197°-212° ;F (97°-100°C).

5. Park vehicle on level ground and wait a minimum of five minutes after engine is shut off. Check engine oil level to make sure it's at the FULL mark on the dipstick.

6. Mark the oil level on the dipstick with a scribe, if it is not exactly at FULL mark.

7. Record the vehicle's mileage, date of oil change and exact location of oil level on the Customer Service Order.

8. Return vehicle to customer and have customer check the engine oil level at each fuel fill and return the vehicle if oil level is at the ADD mark. If the oil level remains in the "cross-hatch" area, have the customer continue operating the vehicle for a minimum of 2000 miles (3218 km) before returning the vehicle for final oil consumption verification.

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11-29-2005, 03:13 AM	#2
willfxp Member Join Date: Nov 2005 Location: Seattle, WA Posts: 421 1997 SW2	Re: Cleaning Pistons of 1.9L -The Saturn Way Yeah, if it's not too difficult, could you post the second procedure? Thanks! ... 1997 Saturn SW2 REWARD EXCELLENCE! Rate the quality of this post and help <i>willfxp</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you! quote +
11-29-2005, 07:47 AM	#3

bgsneeze

Member

Join Date: Jan 2005

Location: Ohio

Posts: 285

2003 ION-2 Quad Coupe
1997 SL2**Re: Cleaning Pistons of 1.9L -The Saturn Way**

OK i dont have a scanner to add the photos, i will try to add them later.
the next part requires taking the engine apart. Hope this helps.:

"Procedure - 2 Engine Repair

Important

Before proceeding with engine repair, consideration should be given to engine assembly replacement. Saturn may have warranted remanufactured engine assemblies available for this vehicle.

One or more of the following conditions may also cause oil consumption:

- * Engine oil level not being properly checked
- * External oil leakage
- * Incorrect positive crankcase ventilation (PCV) valve installed
- * Oil control ring(s) worn
- * Compression ring(s) worn
- * Cylinder bores worn and/or poor surface finish
- * Cylinder bores tapered, scored or out-of-round
- * Oil leakage between the valve guide and cylinder head
- * Piston ring(s) not installed correctly
- * Oil leakage past the valve stem seal(s)
- * Poor surface finish on the valve stem(s), (scuffs, scores and burrs)

The compression check will identify damaged pistons and/or rings, valves, head gasket and carbon build-up on pistons or in the combustion chamber, etc.

A cylinder leakage test will identify location of compression loss (damaged intake or exhaust valve, piston or rings, cylinder head or gasket, etc.).

1. Remove and inspect spark plugs. Oil fouling or oil residue on a spark plug electrode may indicate the cylinder that may have damaged valve stem guides, cylinder bores and/or piston rings.
2. Check cylinder compression. Refer to "Compression Check" procedures in appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual, for vehicle being worked on.
3. Check cylinder leakage. Refer to "Cylinder Leakage Test" procedure in appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual, for vehicle being worked on.

Important

The air pressure shut off valve must be closed when adjusting regulator to 689 kPa (100 psi). Then, open shut off valve and allow air pressure to stabilize before recording air pressure/cylinder leakage to obtain accurate readings.

4. If compression and cylinder leakage are not within specification, refer to the appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual for further diagnosis.

Object Number: 1284483 Size: MF

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5. If compression and cylinder leakage are within specification, remove, disassemble and inspect cylinder head for oil leakage at the bottom of valve guides and between the valve guide outside diameter and cylinder head casting. If oil or carbon residue is present at the:

- * Bottom of the valve guide , oil is leaking past the valve stem seal. If oil is leaking past the valve stem seal, inspect the valve stem for scratches, scuffs, scores and burrs. Carbon deposits should be similar in appearance when comparing intake or exhaust valves to each other. A difference in appearance may indicate oil is leaking between the valve guide and cylinder head, or past the valve stem seal. Measure the valve to guide oil clearance using the appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual. Replace intake and/or exhaust valves, guides and all stem seals as required.

Notice

Only Saturn recommended essential tools must be used to remove valve spring retainers. Use of other tools can cause valve stem and seal damage resulting in oil consumption.

* Valve guide outside diameter next to the cylinder head casting, the oil is leaking between the outside diameter of the valve guide and the cylinder head casting. (To help identify an oil leak between the outside diameter of the guide and the cylinder head casting, apply several drops of engine oil dye SA9176NE around the outside diameter of the valve guide and allow to sit for a minimum of three minutes. Use Black Light Kit SA9175NE to identify oil leak location.) Oil leaking between the outside diameter of the valve guide and the cylinder head casting can be caused by a damaged cylinder head casting valve guide bore. If oil is leaking between the outside diameter of the valve guide and the cylinder head casting, refer to the appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual, and install an oversize valve guide.

Object Number: 1284485 Size: MF

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6. Remove the connecting rod and piston assemblies from the engine and inspect the rings for correct installation, sticking and wear. The oil control rings must rotate freely on the piston. Aligned piston rings end gaps will not cause oil consumption. (Refer to appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual.)

7. If the pistons are to be reused:

- * Remove and discard the piston rings, and soak the piston in GM Piston and Ring Cleaner (P/N 12378549), or equivalent, to remove the carbon deposits in the ring land and piston tops.
- * After soaking the pistons, carefully remove any remaining carbon deposits from the ring grooves by using a piece of ring from the old piston ring set.

8. Refer to the procedures in the appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual, and check for cylinder bore scoring, wear, taper and out-of-round (use Dial Bore Gauge SA9178NE-A or equivalent). The specific procedures must be followed to determine if the cylinder can be flex honed. If the cylinder bores are not within specification, oversize pistons or a new cylinder block will be required to repair the engine.

9. If all cylinder bore checks are within specification, hone the cylinder bores using the Saturn recommended Flex Hone SA9171E, 83 mm (3.25 inches) bore and 320 grit, silicone carbide hone.

Notice

Make sure crankshaft pulley/damper keyway is at 3 or 9 o'clock position to prevent damage of crankshaft connecting rod journals during honing.
10. - Hone the cylinder bores using a 10W-30 or 5W-30 weight motor oil and the Flex Hone (SA9171E).
- Make sure the flex hone is rotating upon entry and removal from the cylinder bore.

Important

The recommended speed of the flex hone is 150-200 rpm. Do not use air pressure driven or high-speed tools.
11. - Use 60 strokes per minute. Honing time should be approximately 20 seconds or 20 strokes per cylinder to develop a 40-50 degree (included angle) honing crosshatch. One "stroke" consists of a full downward and upward motion of the flex hone in the cylinder bore.
- Thoroughly scrub all cylinder bores after honing with a scrub brush, a strong solution of hot water and Tide® powder laundry detergent or equivalent. Thoroughly rinse with hot clean water (high-pressure, if available).

Notice

If the cylinder bores are not thoroughly cleaned, the residual grit from the honing stones will wear out the piston rings and cylinder bores extremely fast, resulting in oil consumption. Never use solvent to clean cylinder bores; it only redistributes the grit on the cylinder walls; detergent and hot water will carry the grit away.
12. Dry the cylinder bores and wipe them with a clean white towel saturated with engine oil. Dark residual grit on the towel after wiping the cylinder bore indicates the bores are not clean. The cylinder bore cleaning process described previously must be repeated until the towel is free of all dark residual grit.

Notice

Do not use abrasive pads to clean cylinder head and block surfaces that are sealed with the cylinder head gasket. Bristles or particles from abrasive pads can cause cylinder bore scoring and/or piston ring damage. Gasket material on cylinder head and block surfaces that are sealed with the cylinder head gasket should be removed with a plastic or wood scraper.
13. 10. Install pistons with new rings and re-assemble engine. Refer to appropriate year Engine Mechanical or Engine/Fuel/Air Intake/Exhaust Service Manual.

Parts Information

Part Number

Description

12378549

GM Piston and Ring Cleaner

21000872

Filter ASM-Oil

For any other parts, refer to the Saturn Parts and Illustrations Catalog for the correct part numbers."

...

You say you just passed 100,000 miles.....well I guess it is time to take off the training wheels!

REWARD EXCELLENCE!

Rate the quality of this post and help bgsneeze reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

quote

+

07-28-2006, 07:05 AM

#4

bobbyrae

Member

Join Date: Oct 2005
Location: Alameda, CA
Posts: 445

bobbyrae's Photos

1993 SL2

Re: Cleaning Pistons of 1.9L -The Saturn Way

I think it's just fantastic that you posted this and I think it is just what my engine needs. I DID find someone posting a similar thread over at Edmunds dot com and they seemed to be quoting the TSB pretty well. One thing that sounds really important that I did NOT see mentioned here is:

Important
It is critical in this cleaning process that the piston and ring cleaner remain in the cylinders for a minimum of two hours to fully clean the components. The cleaner solution must be removed before three hours. Additional soak time does not increase the effectiveness of this process. If solution with the dissolved deposits remains in the cylinder too long, it will soak back into the rings and cause them to stick again. If this happens, the oil economy will be reduced even further

.

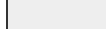
Originally, I saw the minimum 2 hours, and thought, "what the hell, let it soak for a day or two!" But I have NOT seen any real change. Now I think I will try again, this time going no more than three hours.

...

Bobby Rae
Alameda, CA
1993 SL2 A/T, 80k miles, 22/33/43 mpg
1982 Accord 5-speed, 303k miles, 23/32/40 mpg

www.saturnfans.com/forums/showthread.php?t=65966

4/7

	REWARD EXCELLENCE!  Rate the quality of this post and help <i>bobbyrae</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!   
07-28-2006, 08:00 AM bgsneeze Member  Join Date: Jan 2005 Location: Ohio Posts: 285 2003 ION-2 Quad Coupe 1997 SL2 	Re: Cleaning Pistons of 1.9L -The Saturn Way I'm glad you found the information helpful. There seems to be a revision of the TSB that has the max soaktime added, the one i saw didn't. Thanks for posting the max soak time. ... You say you just passed 100,000 miles.....well I guess it is time to take off the training wheels! REWARD EXCELLENCE!  Rate the quality of this post and help <i>bgsneeze</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!   
06-01-2009, 10:27 AM kaptnjack Member   Join Date: Jan 2009 Location: Middle Tennessee Posts: 309 1995 SW2 1994 SL2 	Re: Cleaning Pistons of 1.9L -The Saturn Way thats some good info. I recently did the marvel mystery oil soak "MMO" and left it for 24 hours. I had just bought the car and restoring it for my nephew...the MMO soak was a preventive measure and I had no history on the car. this info may suggest that even with the MMO ...a few hours may have better results than longer soaks. Even a series of three hour soaks may be more beneficial. The info about the mobil 1 was interesting too. REWARD EXCELLENCE!  Rate the quality of this post and help <i>kaptnjack</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!   
06-01-2009, 05:03 PM MikalCarbine Member   Join Date: May 2008 Location: Bloomfield, CT Posts: 366 1997 SL2 	Re: Cleaning Pistons of 1.9L -The Saturn Way I think I've seen this or something similar before elsewhere, nonetheless it is good information and has resparked my curiosity. I know GM Top Engine Cleaner is good, does anyone think this procedure is comparable with Seafoam? Edit: Whoaa old OP, this WAS the thread I saw a while ago 😊 just noticed it in my bookmarks ... Current: 1997 SL2 auto @ 117k Sold: 1997 SL2 auto @ 150k Sold: 1998 SL1 5spd @ 138k <i>Last edited by MikalCarbine; 06-01-2009 at 05:10 PM..</i> REWARD EXCELLENCE!  Rate the quality of this post and help <i>MikalCarbine</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!   
06-02-2009, 06:55 PM bgsneeze Member  Join Date: Jan 2005 Location: Ohio Posts: 285 2003 ION-2 Quad Coupe 1997 SL2 	Re: Cleaning Pistons of 1.9L -The Saturn Way Well I cant remember for sure, as my 97 SL2 is now long gone, but I want to say that seafoam is a little thinner than MMO or the GM Top Engine Cleaner. I remember the Saturn mechanic saying that if the cleaning solution was too thin it could run past the rings and directly into the engine oil. I also talked with a few mechanics about the use of Mobil 1 after the soak, they said that any good full synthetic is needed because it can better handle any remaining cleaner that would be left in the engine as well as the better cleaning properties of synthetic oils. I am glad to know that even years after posting this TSB it is still useful to SL2 owners. ... You say you just passed 100,000 miles.....well I guess it is time to take off the training wheels! REWARD EXCELLENCE!  Rate the quality of this post and help <i>bgsneeze</i> reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

07-08-2009, 11:25 AM

#9

Dubs Films

Junior Member

Join Date: Jun 2009

Posts: 17

Re: Cleaning Pistons of 1.9L -The Saturn Way

excellent write-up

REWARD EXCELLENCE!

Rate the quality of this post and help *Dubs Films* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

10-03-2011, 08:13 PM

#10

ericnlyvone

Junior Member

Join Date: Jun 2008

Posts: 25

ericnlyvone's Photos

Re: Cleaning Pistons of 1.9L -The Saturn Way

Has anyone that has performed this or any other engine soak ever seen a reduction in oil usage?

REWARD EXCELLENCE!

Rate the quality of this post and help *ericnlyvone* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

10-04-2011, 09:19 AM

#11

fetchitfido

Super Member

Join Date: May 2006

Posts: 14,405

fetchitfido's Photos

2001 SC2

Re: Cleaning Pistons of 1.9L -The Saturn Way

If you catch it early enough, yes. Otherwise it's just a lot of smoke.

...

The proper way to fix a S-Series automatic is to replace it with a 5spd O:)

REWARD EXCELLENCE!

Rate the quality of this post and help *fetchitfido* reputation points. Click the reputation button near the bottom left corner of this message box. Thank you!

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When did Saturn change pistons?	Maritime Storm	S-Series Tech	2	08-17-2007 01:19 PM
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